A METHODOLOGICAL DEFINITION FOR TIME REGULATION PATTERNS AND LEARNING EFFICIENCY IN COLLABORATIVE LEARNING CONTEXTS

Marga Franco-Casamitjana[1], Elena Barberà[2], Margarida Romero[3]

....

[1] eLearn Center (UOC)
mfrancoca@uoc.edu
[2] eLearn Center (UOC)
ebarbera@uoc.edu
[3] eLearn Center (UOC) &
Université Laval, Canada
margarida.romero@gmail.com

A Methodological Definition for Time Regulation Patterns and Learning Efficiency in Collaborative Learning Contexts

ABSTRACT:

This article defines a methodological design for analysing time regulation patterns and learning efficiency in collaborative learning contexts in online education. The methodological design explained here is based on a thorough literature review of time regulation in learning contexts and its adaptation to the scenario of the appropriate research framework.

KEYWORDS:

methodological design; time regulation; learning regulation; learning efficiency; collaborative learning; online education.

52

INTRODUCTION

Human beings' lives unfold over time, learning and technology; Reimann (2009) considers that learning develops over time. According to the current scenario, which tends to make claims for social and economic paradigm change and constant time factor cost, it is useful to find out about time regulation strategies for obtaining learning efficiency in order to improve individuals' lifelong learning goals.

This article explains a methodological definition for analysing time regulation patterns that generate learning efficiency, specifically in collaborative learning, within an online education environment. This methodological design is part of a research framework that would explain the time regulation shown by online students and some effects this could have on the collaborative learning efficiency they obtain.

BACKGROUND RESEARCH

The theoretical background is based mainly on paradigms of cognitivism and social constructivism. Learning self-regulation and collaborative learning are particularly studied from social constructivism paradigm. Learning self-regulation is contextualized by self-regulation strategies, metacognition, co-regulation and socially shared regulation (Hadwin, Järvela & Miller, 2011; Zimmerman & Schunk, 2011; Alexander & Schwanenflugel, 1994). This article analyses time regulation considering both the collaborative learning level, task coordination in terms of time regulation and team and individual regulation of learning times (Fransen, Kirschner, & Erkens, 2010). The main research, on which the article is based, uses an approach to "Temporal Self-Regulation Theory" in order to follow a theoretical framework for human behaviour concerning temporal aspects and a specific

guideline on "self-regulatory capacity" (Hall & Fong, 2010), which is explained in the following sections. Moreover, time regulation and learning efficiency are mostly based on a cognitivism paradigm. Time regulation is considered as a part of learning regulation and determined by productivity (Reimann, 2009; Vohs & Schmeichel, 2003; Macan, 1994).

LEARNING REGULATION

Learning regulation has been defined as the capacity to intentionally plan, control and affect with our actions in such a way that learners have active control of their own learning and outcomes (Hadwin, Järvelä & Miller, 2011). Learning regulation is therefore focused on the processes by which learners are able to set goals, plan, execute, affect and adapt their own learning. Regulation in learning is metacognitive and social, and learners are able to regulate behaviour, cognition and motivation. Findings have described learning regulation as intentional and goal directed, and goals can guide strategies and give some information about the standards used for monitoring, evaluating and regulating. Considering these authors, researchers can obtain some information about learners' direction, motivation and intent if they know what their goals are.

The role of metacognitive planning, monitoring and control processes is one of the main points of the learning regulation theories, especially concerning self-regulation. A strategic change in thinking, feeling and action occurs when learners perceive a difference between where they are, as individuals or as a group, and where they would like to be. Metacognitive processes must be measured, observed and systematically analysed when doing research about learning regulation (Hadwin, Järvelä & Miller, 2011).

#05 A METHODOLOGICAL DEFINITION FOR TIME REGULATION PATTERNS AND LEARNING EFFICIENCY...

53

UOC eLEARN CENTER

54

Regulated learning is, for some authors, a social activity, so the social context and its interaction are basic elements for understanding it (Volet, Summers & Thurman, 2009). Motivational, cognitive or behavioural challenges, and control over them (Perry & VandeKamp, 2000) foment active learning regulation in individual and collaborative learning environments (Hadwin, Järvelä & Miller, 2011). Learners can regulate motivation, cognition and behaviour. In addition, learners are able to change their context, their groups and themselves.

According to the literature, there are three kinds of regulated learning: Self-Regulated Learning (SRL), Co-Regulated Learning (CoRL) and Socially Shared Regulated Learning (SSRL). "Self-Regulated Learning (SRL)" is the goal-directed action or process when individuals regulate their own learning process cognitively, behaviourally, contextually and motivationally (Pintrich, 2000). SRL therefore appears when students consciously and intentionally plan, monitor and regulate cognition, behaviour, motivation and emotion in order to complete an academic task and goal. Social cognitive theory considers that SRL is conducted in environmental conditions that promote adopting, developing and refining strategies, plus monitoring, evaluating, setting goals, planning and embracing and changing processes. SRL takes place in individual, cooperative and collaborative learning activities and tasks in new contexts, as well as changing structures and environment conditions. Hadwin, Järvela and Miller (2011) cite the fact that the self-regulation principal goal is the independence or personal adaptation in regulatory activity.

Co-Regulated Learning (CoRL) is the regulatory ability between oneself and others and the activity system, while carrying out tasks alone, cooperatively or collaboratively. The goal of CoRL is a transition towards self-regulation or mediation of individual adaptation and the regulatory competence among group members. CoRL are emergent interactions that temporarily mediate regulatory work, such as strategies, monitoring, evaluation, goal setting and motivation (Hadwin, Järvelä & Miller, 2011).

Socially Shared Regulation of Learning (SSRL) goal is collective adaptation and regulation of collaborative processes. Several individuals therefore regulate themselves individually in order to co-construct and synthesize strategies, monitoring, evaluation, goal setting, planning and beliefs, leading to shared outcomes. SSRL takes place in cooperative and collaborative tasks, when interdependent or collectively shared regulatory processes, beliefs and knowledge produce a co-constructed or shared outcome (Hadwin, Järvelä & Miller, 2011).

TIME REGULATION

This article considers time regulation as actions or behaviour processes linked to time, which are planned and executed to achieve greater efficiency in learning tasks, at the self-, co-, and socially shared regulation level. However objectives and motivation, economic and human resources should be taken into account along with quality time, quantity time, time flexibility and cognitive capacity, as individuals' resources and changeable elements for obtaining productivity. Time regulation is a dimension consisting of four perspectives, global and subjective time, and quantity and quality time. Global time is characterized by cultural, social and institutional agreement about time, in contrast to subjective time as a self-regulation through the perception of time (Vohs & Schmeichel 2003). Quantity time, or time-on-task, is the number of minutes spent learning, whereas quality time alters learning performance (Romero & Barberà, 2011).

The categories used to study the time factor will be based on Macan, Shahani, Dipboye and Phillips (1990), when they designed a survey for measuring the Time Management Behaviour Scale (TMBS). Even though there are not many studies relating learning regulation and the time factor, those available offer significant results to be used as a theoretical and empirical framework.

Macan (1994) mentions the interest of doing research about other contexts and individual characteristics which appear for individuals who have the perception of time control. According to Winne and Hadwin (2008), regulation means an adaption or a change over time. Therefore, as some authors suggest the importance of researching how students regulate particular study activities or tasks, or activities during periods of time. Hadwin, Järvelä and Miller (2011) state that research mixing self-regulated learning, co-regulated learning and socially shared regulated learning could shift the granularity from a particular study and series of episodes. The same authors say that the way individuals and groups build on regulatory processes, strategies and knowledge over time, and over tasks, should be studied.

Alexander and Schwanenflugel (1994), after studying metacognitive attributions and the knowledge base, conclude that strategy regulation is composed of a complex interaction of different factors. This research will seek to explain how learning regulation is composed by different elements, and to highlight time regulation as being one of the main ones. This research will follow the way that online students have less time to study but have developed significant learning regulation strategies during their studies in order to be better time managers, whether or not they had this ability before their online studies.

Self-Regulated Time (SRT) is those temporal actions or processes that individuals use to regulate their own time so as to achieve a goal. According to Vohs and Schmeichel (2003, p. 217), SRT is related to temporal processes and implicit or explicit judgements, which "underlie people's attempts at self-regulation, such as time duration, time orientation and intertemporal choice".

Macan, Shahani, Dipboye and Phillips (1990) list three time management factors from Lakein's ideas: to set goals and priorities, time management mechanics, and a preference for organization. As control over those three time management factors grows, perception of control over time increases. Macan (1994) proposes that time management behaviours are connected through a perception of control over time. Individuals who recognise themselves to be in control of their time avoid experiencing frustration and tension, compared to those who do not perceive themselves as having such control. Students in the Macan, Shahani, Dipboye and Phillips (1990) study who considered themselves to have control over their time reported more satisfaction at school.

Co-Regulated Time (CoRT) is those actions or processes that a group of people use to regulate their time in common so as to achieve a collective goal. However, a group of cognitions operates very differently to the sum of individual cognitions (Stahl & Hesse, 2006), and Reimann (2009, p. 240) cites that "learning unfolds over time". The time factor is related to quantity and sequence, as individuals learn by accumulation of experiences (Ritter et al. 2007). This is therefore heightened when people are learning in groups, because communication and interaction processes are added (Reimann, 2009). Hadwin, Järvelä and Miller (2011) study outcomes, giving several clues for continuing research about which strategies are effective for individual and collective regulation of those challenges.

#05 A METHODOLOGICAL DEFINITION FOR TIME REGULATION PATTERNS AND LEARNING EFFICIENCY...

55

External Regulated Time (ERT) includes the temporal actions or processes that groups use to regulate their common time in accordance with global time, in order to achieve a collective goal. In this sense, global time is understood by cultural, social and institutional agreement about the value given to time (Vohs & Schmeichel, 2003), as the concept of time diversifies among individuals, organizations, or societies (Collinson & Cook, 2001).

Individuals who have the capacity to use an effective self-regulation in everyday life are able to improve self-regulatory abilities and practice compensatory strategies. "Temporal Self-Regulation Theory (TST)" is described by Hall and Fong (2007, p.6) as a theoretical framework for understanding human behaviour in general, including temporal aspects "to make sense of human behavioural patterns that seem to represent, on the surface, significant deviations from rationality". TST is based on the construct of "Self-regulatory capacity" (SRC), defined by the authors as the capacity "to exert top-down control over one's actions" (Hall & Fong, 2010, p. 86). They suggest that it is almost synonymous with executive function. Executive function can therefore be studied by reaction time task tests.

This study uses TST to approximate temporal self-regulation and efficiency in order to identify human behaviour patterns in education and whether there are some individuals who have the capacity to use effective self-regulation in everyday life. Accordingly, the research framework is intended to look at how such individuals improve self-regulatory abilities and practice compensatory strategies in their learning activity.

METHODOLOGICAL DESIGN

In order to construct a methodological design for time factor strategies and time regulation typologies, some customized instruments for obtaining reliable and appropriate data must be created.

LEARNING EFFICIENCY

Paas and Van Merriënboer (1993) designed the Deviation model (Hoffman & Schraw, 2010) to measure the efficiency of the mental processing with two variables: learning performance, such as examination scores, and cognitive effort, which is the students' estimate of the mental effort expended. In addition, other authors (Stanovich & West, 1998; Streiner, 2003; Streiner & Norman 2003, & Warnick et al. 2008) have defined the Conditional likelihood model (Hoffman & Schraw, 2010). This article is based on the Conditional likelihood model, considering learning efficiency as the conditional rate of change or relative gain of performance, time, effort and other individual differences.

Taking into account the Conditional likelihood model (Stanovich & West, 1998; Streiner, 2003; Streiner & Norman 2003, & Warnick et al. 2008), this article measures learning efficiency with four variables: learning performance, cognitive effort, individual learning regulation patterns, and individual time regulation patterns. Learning performance is understood as academic results and acquired learning objectives. Cognitive effort, as with the Paas and Van Merriënboer (1993) method, is measured with a scale scored by students' perception (Tuovinen & Paas, 2004). In this case, a 10-point scale is used instead of a 9-point scale in the original method. The individual learning regulation patterns are the typology of students depending on the learning strategies they use in order to obtain quality and good results in their learning, taking into account the time they invest, shared with personal and work time. Finally, individual time regulation patterns are the typology of students depending on the time strategies they use in order to obtain quality and good results in their learning.

In addition, collaborative learning efficiency is measured with four variables: team learning performance, cognitive effort, co-regulated learning patterns, and co-regulated time patterns. The team learning performance is the academic results and the common acquired learning objectives as a group. Cognitive effort is measured with a 10-point scale by the members of the working team, based on Paas and Van Merriënboer (1993) method.

In this section, firstly the independent and dependent variables are introduced, followed by the description of the instruments designed for the purposes of this study. In table 1, the variables and instruments that will later be introduced in this section can be seen.

INDEPENDENT VARIABLES

The independent variables that the methodological design takes into account are individual learning regulation patterns and individual time regulation patterns.

The individual learning regulation patterns are mainly obtained from a questionnaire designed for the study to collect learning regulation pattern data, such as learning strategies concerning the steps students'

follow during the learning process. The sources of this independent variable are the self-reported declarations of the students in this questionnaire. The research indicators of these variables are: clear ideas about how to study and number of credits studied at the same time. Meanwhile, the variables of interest are the specific time regulation patterns, which have some effect on the collaborative learning process.

The independent variables - individual time regulation patterns - are collected from personal experience of the sample through the analysis of a questionnaire. Data is needed on their personal strategies, actions and attitudes related to their individual and collaborative learning activities. Data is also needed about their timetable, including family, work, learning and spare time. The source of this information is the students' responses from the questionnaire. The information is presented on a 10-point scale, or transformed into a 10-point scale during its analysis in order to be able to work with different data. Results are also compared with direct observation. The research indicators of individual time regulation patters are: clear ideas about how to plan the study; the number of working hours per week, and the number of family constraints.

#05   A METHODOLOGICAL DEFINITION FOR TIME REGULATION PATTERNS AND LEARNING EFFICIENCY...

57

Table 1. Synthesis of the variables and instruments.

Variables	Concept	Instruments
Independent Variable	Individual learning regulation patterns	Questionnaire (Q) Interview & Personal Diary (IPD)
Independent Variable	Individual time regulation patterns	Questionnaire (Q) Interview & Personal Diary (IPD)
Dependent Variable	Learning Efficiency	Interview & Personal Diary (IPD) Learning Activity Register (LAR)
Dependent Variable	Collaborative Learning Efficiency	Interview & Personal Diary (IPD) Observatory Category Table (OCT)

DEPENDENT VARIABLES

The dependent variables that are included in the methodological design are learning efficiency and collaborative learning efficiency.

Learning efficiency as a dependent variable is obtained from an interview and personal diary, and from a learning activity register. The sources are the students and professors. This variable is included in questions in the interview and the personal diary, such as learning strategies used to study, and learning strategies used to study related to time. Meanwhile, it is also considered in a 10-point scale within the interview and the personal diary, such as cognitive effort and time invested in learning (Time-on-Task). Effective learning within a learning activity record is collected in some items: time of connections and communications in the classroom, learning strategy used in the classroom, and individual steps showed in the classroom. The research indicators of this dependent variable are the learning objectives acquired; academic results; cognitive effort; time invested in learning, and clear ideas about how to study and how to obtain learning efficiency.

Finally, collaborative learning efficiency is also included in the interview and personal diary and in the learning activity register. The source is the students and professors. This dependent variable is extracted from same items of learning efficiency, though adding the collaborative point of view. However, the research indicators of collaborative learning efficiency are acquired learning objectives; academic results; cognitive effort; time invested to do the collaborative work; level of participation of the rest of the group, and clear ideas about how to work in a team in online environments.

All variables measure the activity during the same period of time; according to Reimann
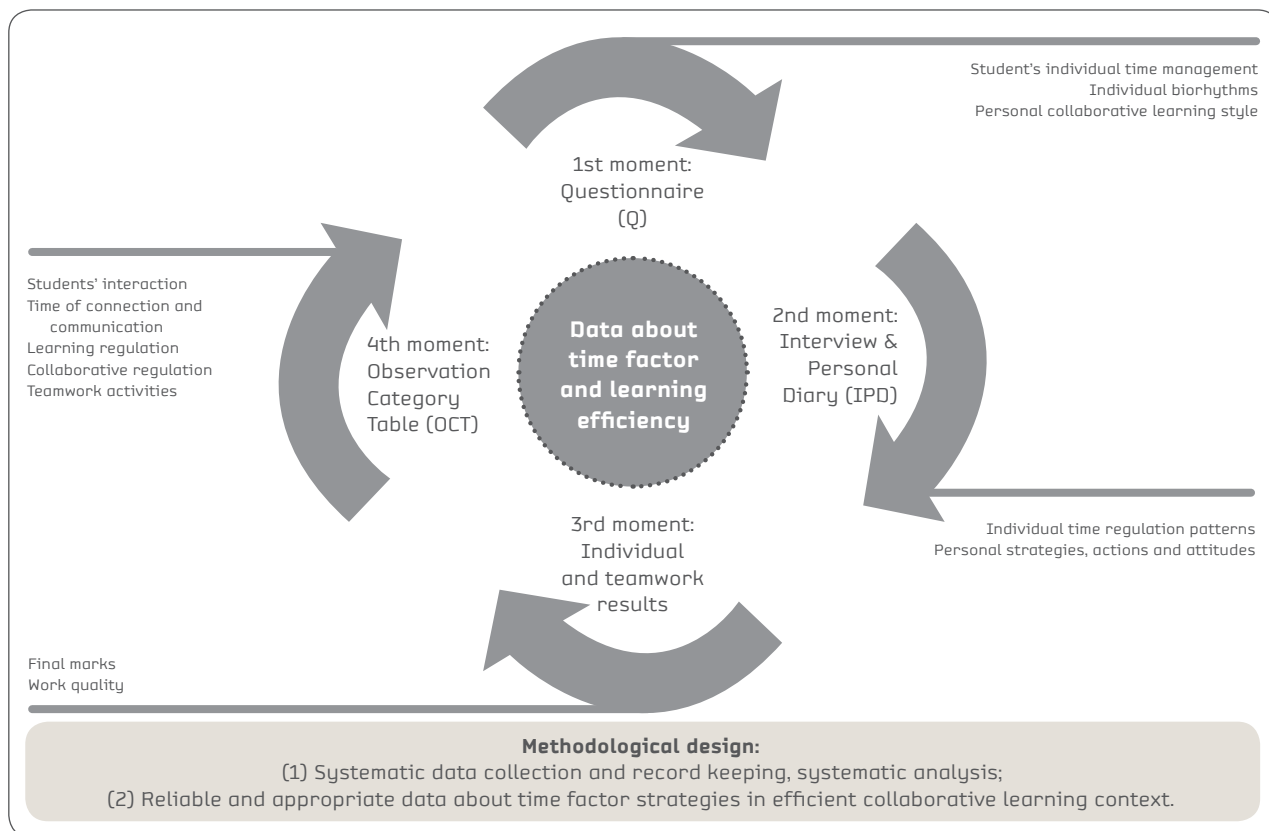
(2009) the temporal unit should be the same for all variables, as he called "minimal unit of time". This period lasts two semesters, divided in four variables collecting moments. The first moment is focused on obtaining individual time regulation patterns. The second moment obtains the cognitive effort and time quantity during the individual and collaborative activity. The third moment is when the quality of the final collaborative piece of work and the final individual marks are displayed. Finally, the fourth moment is the observation of the activity into the classroom, to check the reliability of the data survey and compare the results with the individual and team learning objectives.

RESEARCH INSTRUMENTS

The methodological design uses three different research instruments: a questionnaire, an interview which includes a personal diary, and an observation register. The first research instrument is a Questionnaire (Q), which is needed to record time regulation patterns in order to obtain collaborative learning efficiency. Q should collect time regulation strategies from students enrolled on the courses already mentioned about their personal and studying situations. In order to guarantee maximum possible participation, an agreement with the lecturer is planned. A sample of at least two hundred students is required, with a view to obtain significant conclusions. Q consists of thirty-nine questions; the first part has fifteen questions about the student profile, such as family, work and study, in order to identify the students' individual time management. The second part, about time regulation personal style, has six questions, such as the possible use of individual biorhythms in order to achieve more efficiency, time management, learning strategies and planning skills. Finally, there are eighteen questions about personal collaborative learning style. Q has five open questions, asking the

Figure 1. Methodological Design Workflow

Student's individual time management
Individual biorhythms
Personal collaborative learning style

1st moment:
Questionnaire
(Q)

Students' interaction
Time of connection and
communication
Learning regulation
Collaborative regulation
Teamwork activities

4th moment:
Observation
Category
Table (OCT)

**Data about
time factor
and learning
efficiency**

2nd moment:
Interview &
Personal
Diary (IPD)

Individual time regulation patterns
Personal strategies, actions and attitudes

3rd moment:
Individual
and teamwork
results

Final marks
Work quality

Methodological design:
(1) Systematic data collection and record keeping, systematic analysis;
(2) Reliable and appropriate data about time factor strategies in efficient collaborative learning context.

respondents to write down five strategies they follow when they are studying and another five strategies that they use when they are working in a collaborative activity. The rest of the questionnaire has pull-down questions.

The second research instrument is an interview, which includes a personal diary (IPD). This instrument is carried out like an interview and aimed at twenty of the respondents to the Q, who agree to participate as volunteers after being asked to cooperate. IPD collects the individual time regulation patterns, personal strategies, actions and attitudes about individual and collaborative learning activities, while they are learning in collaborative context. IPD has three grids corresponding to three different days, where there are vertical lines, with time distribution from 00:00 to 23:00 and horizontal lines with some daily activities. Moreover, the IPD has some open questions

about time factor strategies and attitudes concerning individual and collaborative learning activities in order to clarify possible misinformation from the Q. The interviewer fills in the grid and the details about the studying activities by asking the students.

Finally, an observation register is used to compare what individuals say and what they actually do, by using the observation method in virtual classrooms. The Observation Category Table (OCT) has some labels connected with the theoretical background and the items considered in the two previous instruments. The first part of the OCT collects the data interaction of all the students, the day and time of their connection and communication into the classroom spaces. However, the second part compares the answers given in the Q and IPD learning regulation, collaborative learning regulations and teamwork activity items, with

the class activity. These labels make it possible to engage the three research techniques, in order to analyse the same aspects during the three studies.

The research follows a mixed methodology in order to work with quantity data to obtain students' profiles according to their time regulation and learning, and quality data to complete the different dimensions of the study. The methodological dimension of the Questionnaire (Q) is based mainly on a quantitative data analysis; however, the Interview and Personal Diary (IPD) and the direct observation of the classroom are based on a qualitative data analysis to corroborate the answers.

NEXT STEPS IN THE DEVELOPMENT OF THE RESEARCH FRAMEWORK

A first release of the research framework for studying time regulation study is being made. The objective of the research framework is to characterize time regulation and its effects on learning efficiency through online education, in which the mentioned methodological design is being used. This research analyses time and learning regulation and learning efficiency in collaborative online education. This research is proposed to answer the following main research question: "What are students' time regulation patterns for achieving learning efficiency in collaborative learning contexts?".

Moreover, the specific objectives of this research are to create a usable methodological design guaranteeing systematic data collection and record keeping, systematic analysis, and providing reliable, appropriate data about time regulation patterns, in order to obtain collaborative learning efficiency.

The study sample is taken from students who are studying different courses in an online university, and after passed at least 15 credits (375 hours of studying into the European Credit Transfer and Accumulation System) of their unfinished grade, so as to guarantee a minimum of expertise as an online learner. The dimension of the sample should be not smaller than two hundred respondents. The selected courses to be analysed should have at least four aspects in common: courses must follow complete online methodology; courses should have at least one collaborative activity; the collaborative activity must follow teams' similarities, and its syllabus must include a competency for developing the capacity for teamwork and collaborative learning. Moreover, in order to be able to generalize from the answers, the courses should be selected from degrees of very different branches of knowledge, from social sciences to science & technology, and from different languages.

In order to analyse the qualitative data, it is created a results matrix by using ATLAS. TI programme to acquire data reduction, disposition and transformation. However, taking into account the qualitative data obtained after the application of the three instruments, the Homals analysis will also be used to find out the time regulation typologies. This technique performs a homogeneity analysis and it makes possible to group the variables into sets, which allows the examination of the different kinds of students' profiles and the time factor strategies that they use, and their learning efficiency. Despite of the issues related to time require qualitative methodology in nature (Barberà, Gros & Kirschner, 2012), there are some specific quantitative data, which is analysed by SPSS programme.

Considering the value of time factor, the increase in e-learning solutions and the global and collaborative contexts, a methodological definition of time factor strategies is needed within a social and economic paradigm-changing scenario.

References

Alexander, J. M. & Schwanenflugel, P. J. (1994). Strategy Regulation: The Role of Intelligence, Metacognitive Attributions and Knowledge Base. *Developmental Psychology, Vol. 30, N. 5*, 709-723.

Barberà, E. & Clara, M. (2012). Time in e-Learning Research: A Qualitative Review of the Empirical Consideration of Time in Research into e-learning. ISRN, vol. 2012, 1-11 http://www.isrn.com/journals/education/2012/640802/

Barbera, E., Gros, B. and Kirshner, P. (2012). Temporal Issues in E-learning Research: A Literature Review. British Journal of Educational Technology, 43(2), 53-55. http://onlinelibrary.wiley.com/doi/10.1111/j.1467-8535.2011.01255.x/abstract

Collinson, V. & Cook, T. F. (2001). "I don't have enough time": Teachers' interpretations of time as a key to learning and school change. *Journal of Educational Administration, 39, 3,* 266-281.

Fransen, J; Kirschner, P. A. & Erkens, G. (2010). Mediating team effectiveness in the context of collaborative learning: The importance of team and task awareness. *Computers in Human Behavior,* doi: 10.1016/j.chb.2010.05.017.

Grau, V., & Whitebread, D. (2012). Self and social regulation of learning during collaborative activities in the classroom: The interplay of individual and group cognition. Learning and Instruction.

Hadwin, A. F.; Järvela, S. & Miller, M. Self-Regulated, Co-Regulated, and Socially Share Regulation of Learning. Chapter 5. In Zimmerman, B. J. & Schunk, D. H. (2011). Handbook of Self-Regulation of Learning and Performance. New York: Routledge.

Hall, P. A. & Fong, G. T. (2010). Temporal self-regulation theory: looking forward. *Health Psychology Review, 4:2*, 83-92.

Hall, P. A. & Fong, G. T. (2007). Temporal self-regulation theory: A model for individual health behavior. *Health Psychology Review, 1:*1, 6-52.

Hoffman, B. & Schraw, G. (2010). Conceptions of Efficiency: Applications in Learning and Problem Solving. *Educational Psychologist, 45(1)*, 1-14.

Janssen, J., Erkens, G., Kirschner, P. A., & Kanselaar, G. (2012). Task-related and social regulation during online collaborative learning. Metacognition and Learning, 7(1), 25-43.

Kirschner, F.; Paas, F. & Kirschner, P. A. (2009). Individual and group-based learning from complex cognitive tasks: Effects on retention and transfer efficiency. *Computers in Human* Behaviour, 25, 306-314.

Lakein, A. (1973). *How to get control of your time and your life.* New York: New American Library.

Macan, T. H. (1994). Time Management: Test of a Process Model. *Journal of Educational Psychology, Vol. 79, N. 3*, 381-391.

Macan, T. H., Shahani, C., Dipboye, R. L. & Phillips, A. P. (1990). College Students' Time Management: Correlations With Academic Performance and Stress. *Journal of Educational Psychology, Vol. 82, N. 4*, 760-768.

Perry, N. E. & VandeKamp, K. J. O. (2000). Creating classroom contexts that support young children's development of self-regulated learning. *International Journal of Educational Research, 33*(7-8), 81-843.

Pintrich, P. (2000). Role of goal orientation in self regulated learning. In M. Boekarts, P. R. Pintrich & M. Zeidner (Eds.). *Handbook of self-regulation*, pp. 452-494. San Diego: Academic Press.

Reimann, P. (2009). Time is precious: Variable - and event- centred approaches to process analysis in CSCL research. *Computer-Supported Collaborative Learning, 4*: 239-257.

61

A METHODOLOGICAL DEFINITION FOR TIME REGULATION PATTERNS AND LEARNING EFFICIENCY...   #05

Franco-Casamitjana, M.; Barberà, E. & Romero, M. (2013).
A Methodological Definition for Time Regulation Patterns
and Learning Efficiency in Collaborative Learning Contexts.
eLC Research Paper Series, 6, 52-62.

Romero, M., Hyvönen, P. & Barbera, E. (2012). Creativity in collaborative learning across the life span, Creative Education. 3(4), 422-429.

Romero, M. & Barberà, E. (2011). Quality of Learners' Time and Learning Performance Beyond Quantitative Time-on-Task. *The International Review of Research in Open and Distance Learning, Vol. 12*, N. 5, 125-137.

Saab, N. (2012). Team regulation, regulation of social activities or co-regulation: Different labels for effective regulation of learning in CSCL. Metacognition and Learning, 7(1), 1-6.

Stahl, G. & Hesse, F. (2006). Focusing on participation in group meaning making. *Computer-Supported Collaborative Learning, 1,* 311–313. DOI 10.1007/s11412-006-9960-2.

Stanovich, K. E., & West, R. F. (1998). Who uses base rates and P(D/H)? An analysis of individual differences. *Memory & Cognition, 26(1),* 161-179.

Streiner, D. L. (2003). Diagnosing tests: Using and misusing diagnostic and screening tests. *Journal of Personality Assessment, 81*, 209-219.

Streiner, D. L., & Norman, G. R. (2003). *Health measurement scales: A practical guide to their development and use* (3rd ed.). Oxford, UK: Oxford University Press.

Tuovinen, J. E. & Paas, F. (2004). Exploring Multidimensional Approaches to the Efficiency of Instructional Conditions. *Instructional Science 32*, 133-152.

Volet, S.; Summers, M. & Thurman, J. (2009). High-level co-regulation in collaborative learning: How does it emerge and how is it sustained? *Learning and Instruction, 19*, 128-143.

Vohs, K. D. & Schmeichel, B. J. (2003). Self-Regulation and the Extended Now: Controlling the Self Alters the Subjective Experience of Time. *Journal of Personality and Social Psychology, Vol. 85, No. 2*, 217-230.

Warnick, E. M., Bracken, M. B., & Kasl, S. V. (2007). Efficiency of the child behavior checklist and strengths and difficulties questionnaire: A systematic review. *Child and Adolescent Mental Health, 17*, 1-6.

Zimmerman, B. J. (2000). Attaining self-regulation: a social cognitive perspective. In P. Pintrich, M. Boekaerts, & M. Zeidner (Eds.), Handbook of self-regulation (pp.13e99). Orlando, FL: Academic Press.